

Claims:

1. Process for the preparation of lactic acid and/or lactate wherein a pentose-containing substrate is homolactically fermented by a moderately thermophilic *Bacillus* species, which ferments anaerobically.
- 5 2. Process according to claim 1 wherein the pentose-containing substrate comprises xylose.
3. Process according to claim 1 or 2, wherein the
10 moderately thermophilic *Bacillus* species is selected from *Bacillus coagulans* and/or *Bacillus smithii*.
4. Process according to any one of the preceding claims wherein the pentose-containing substrate comprises
15 arabinose.
5. Process according to any one of the preceding claims wherein the substrate comprises glucose.
- 20 6. Process according to any one of the preceding claims wherein the fermentation is performed by a mixture of moderately thermophilic *Bacillus* species and another lactic-acid producing microorganism.
- 25 7. Process according to any one of the preceding claims wherein the lactic acid and/or lactate formed is separated from the fermentation broth.
8. Process according to any one of the preceding claims
30 wherein the moderately thermophilic *bacillus* species is grown on a chemically defined medium.

9. Process according to claim 8 wherein the biomass is removed from the fermentation broth prior to the separation of the lactic acid and/or lactate therefrom.

- 5 10. Process according to any one of the preceding claims 8-9 wherein the lactic acid and/or lactate produced is subjected to one or more purification steps after separation from the fermentation broth.